

HVAC SPECIFICATIONS

REQUIREMENTS

All mechanical work shall be free from defects in workmanship and materials for a period of one (1) year from date of final acceptance and shall meet all local and state codes. All details, which develop or are discovered within this period shall be repaired by the Contractor to the satisfaction of the Engineer and at no additional cost.

GENERAL

- The Contractor shall examine the site of the proposed work to determine the existing conditions that may affect the work.
- It is the intention of the Contract Drawings and Specifications to call for finished work, tested and ready for operation. All materials shall be new and of first-quality.
- All material, work, incidental accessories or other details not shown but necessary to make the work complete and perfect, and in all respects ready for operation, even if not specifically specified, shall be provided by the Contractor at no additional cost.
- The Contract Drawings are generally diagrammatic and are intended to convey the scope of work and indicate general arrangement of ductwork, pipes, and induction units. Existing ducts, pipes, utilities, etc. that are damaged during the construction period, whether or not due to the Contractor's negligence, shall be repaired or replaced by the Contractor and left in a condition satisfactory to the Engineer.
- Coordinate locations of all ducts with architectural indicated ceiling plans.
- The space around pipes, ducts, etc. penetrating rated walls, shall not exceed 1/2" and shall be packed solid with Thermaflex, Mineral Wool or equivalent non-combustible material. Penetrator shall be closed off by tight fitting metal couplings on both sides or airtight construction as required by Sections C20-504.5 (b) of N.Y.C. Building Code.

MATERIALS TO BE RETURNED TO THE AUTHORITY

- The Contractor shall deliver all excess material as shown below to a designated area in the W.T.C. complex as directed by the Engineer.
- One (1) 1/2 capacity induction unit

DUCTWORK

- All ductwork shall be furnished, installed and fabricated in accordance with the latest edition of the SMACNA Low and High Velocity Duct Construction Standards Manual, using prime sheets of galvanized steel. All square elbows shall be provided with turning vanes on minimum 4" centers. Provide access doors at all fire and automatic dampers for access.
- All branches and take-offs shall be equipped with volume controllers.
- All finger ducts and flexible connectors shall be 7" diameter unless otherwise indicated on drawing.
- Support horizontal ducts with hangers secured to structural steel above at intervals not exceeding 8'-0". Install additional steel as required.

ACoustical Duct LINER FOR INTERIOR DUCT SPREADS

- Application: Acoustical duct liner shall be installed on the interior surface of the ductwork from the discharge connection of the HVAC equipment for a minimum distance of 10 feet.
- Material:

- One inch thick rigid fiber glass duct liner board.
 - Insulation, including adhesive, shall have a composite fire and smoke hazard rating as tested by procedure ASTM E84, NFPA 255 and UL 723 not exceeding a "Flame Spread" of 25 and a "Smoke Developed" of 55. Johns-Manville "Unacousti-Fit" or approved equal.
 - Insulation shall have a density of 1.5 lbs. per cubic foot with a thermal conductivity of K=0.25 BTU/inch-F/ft² at 75 F mean temperature.
 - The duct liner shall have a NRC of no less than 0.70 based on No. 6 mounting. (Test Method C223) and suitable for air velocities up to 2000 FPM.
 - Installation:
- Apply duct liner to duct surfaces with 100% coverage and approved adhesive.
 - The back surface of the liner shall face the air stream. All joints shall be snug and neatly taped.
 - All exposed edges and joints shall be heavily coated with approved adhesive. A metal roofing shall be installed on all leading edges of the liner.
 - On ductwork over 12" in width and/or sizes over 16" in height, additional mechanical fasteners on a maximum of 15" O.C. shall be used to fasten the duct liner to the duct. Fasteners shall be installed within 5" of the leading edges of all cross joints. All mechanical fasteners shall be flush with liner surface.

FLEXIBLE DUCT CONNECTIONS

Flexible duct connections for ductwork shall be made of an approved flame resistant fabric having a flame spread rating of not over 25 and a smoke development rating of not over 50 and shall not exceed 10 in. in length.

INDUCTION UNITS

- Support and fasten units to prevent air vibration, providing all required wall brackets, supporting legs and leveling devices. Units support method shall be subject to the approval of the Engineer and be similar to the method used for the existing units.
- The Contractor shall adjust induction unit performance as shown on the contract drawings.
- The air connection to the induction units shall be made with "Thermaflex" Type S-TL as manufactured by Anemostat Industries or approved equal, of sizes shown, but not less than 1/2" full unit inlet size. The connection shall be sealed with Minnesota Mining & Mfg. Co. 600 sealant and clamped with Ideal Type 62 hose clamps, or approved equal. Flexible connections that penetrate any rated closures shall be installed as specified.
- Contractor shall thoroughly clean all existing induction units by means of wire brushing or steam cleaning lined surfaces, removing all dust and debris from plenum chamber, cleaning nozzles and replacing filters. All induction units thermostats shall be thoroughly checked for proper operation and recalibrated where required, or replaced if not functional.

PIPING

All piping connecting to the induction unit shall be Copper ASTM B-56, soft (annealed) Type L and fittings shall be standard weight copper and solder. All soldered joints shall be made with 55-5 Tin Antimony Solder having a melting point greater than 450 Deg. F. All soldered joints shall be thoroughly cleaned before the application of the solder. All induction shall match existing.

VIBRATION PAD

Vibration pad shall be "Shear Flex-Plate" as manufactured by Vibration Mountings Corporation Inc. or an approved equal.

CLEAN DISCHARGE

Special nozzles specified are manufactured by Anemostat-Waterloo or an approved equal. All fixtures shall be tested while assembled.

- Diffusers (Supply): shall be Model DF with No. 41 cone pattern (4-way)
- Dampers: Damper for diffusers shall be Model DOB.

WATER COOLED AIR CONDITIONING UNIT

- Furnish and install packaged air conditioning unit. Unit shall be complete with temperature control, compressor, evaporator coil, condenser water regulating valve and other systems components required to provide proper air conditioning for the space designated on the Contract Drawings. Filter shall be Class I, UL listed; 45% efficiency.
 - AC Unit shall be furnished with the following accessories:
- Condensate Pump
 - Disconnect Switch
 - Thermostat

Schedule

Unit	Blower	Supply Fan	Auxiliary		Cooling Water	Model	Total
			Blower	Supply Fan			
AC-1	2000	1	1	1	21 GPM	50BA008	7700 lbs.

AC Unit motor shall be 3 phase and for 460 volts. (MCA No. 91-70-E)

- The Unit shall be factory run, tested and sealed in accordance with AFN Standards.
- AC Unit shall be complete with water regulating valve. Valve shall be Model WCOV type or an approved equal. It shall be a positive shut-off type and shall be rated for 150 psi. working pressure.
- Unit shall be similar or equal to Carrier Inc. and rated at 150 lbs. working pressure.

RELOCATED INDUCTION UNIT

Relocate existing AC unit to new 8'-0" x 24" x 30" deep mechanical room. Relocate existing 1/2" x 24" x 30" deep mechanical room.

PIPING AND ACCESSORIES

A. TEST REQUIREMENTS (Aux. Cooling Water)

Operating Pressure	150 PSIG
Operating Temperature	85 Deg. F - 95 Deg. F
Hydrostatic Test Pressure	1.5 x Operating Pressure
Duration of Test	2 hours

Include equipment, controls, instruments and valves from the piping system during hydrostatic tests

B. Piping & Fittings

System	Pipe	Fittings
Aux. Cooling Water	Black Steel Pipe, Conforming to ASTM A-53 Schedule 40 Grade B, Black Seamless	2-1/2" cast iron screwed 250 lb. class
A.C. Unit	Copper ASTM B-56 Hard Temper Type (L)	Wrought Copper Solder Joint 5 ANSI B16.18

Vent auxiliary cooling water piping at all high points.

C. Accessories

- Units for auxiliary cooling water serving shall be similar and equal to 250 lb. class, malleable iron with bronze seats, Grinnell Figure 504, U.L.
- Nipples 6" length or less, shall be extra heavy and the material shall be the same as the pipe. Close nipples shall not be used.
- Bridged type flexible connector shall be Vibration Mounting and Control Inc. (VICO) Model MFP Style ME Max. 280 psig or approved equal.

D. Soldered Joints

95-5 Tin-Antimony Solder having a melting point greater than 450 F. Excess solder shall be removed while still in the molten state with a file left at the face of the fitting.

E. Thermometers

- Thermometers for piping shall be of the "all angle" (universal), separate socket, industrial type with #304 stainless steel extension neck wells.
- The thermometer for auxiliary cooling shall operate at 0 - 160 Deg. F range and shall include a sufficient safety margin at either end.
- Thermometers shall be as manufactured by Albert A. Weiss, Weisker Instrument Co., Ashcroft or approved equal.

F. Pressure Gauges

- Pressure gauges shall be of the Bourdon tube spring type with 4-1/2" dial sizes. Gauges shall have black aluminum cases with black numbers on white background. The gauges shall be as manufactured by Albert A. Weiss, Weisker Instrument Co. Ashcroft or approved equal.
- The pressure range for the auxiliary cooling, shall be 0 - 200 psi. and the Bourdon tube shall be Bronze.

G. Strainers

Strainers shall be similar and equal to those manufactured by Muller Steam Specialty Co. Screwed "Y" strainers for pipes 2-1/2" and smaller shall be 250 lb. No. 11. The screens for the strainers shall be stainless steel. Strainers shall be provided with capped blowdown valves.

H. Cutting and Patching, Sleeves and Escutcheons

- Pipe passing through walls shall have a trim opening cut no greater than necessary for the installation of a sleeve secured therein. Sleeves shall be 1/2" in diameter larger the outside diameter of the pipe or required insulation passing through, and of sufficient length to be flush with the finished wall surfaces. Sleeves shall be made of Schedule 40 galvanized steel pipe for concrete block partitions and 20 gauge sheet metal for framed partitions.
- Pipe passing through floor slabs shall have an opening core drilled 1/2" in diameter larger than the outside diameter of the pipe or required insulation passing through.
- Annular spaces between piping and sleeves or core drilled floor openings shall be packed with thermaflex and sealed to retain the fire integrity of the walls and floors with a non-hardening compound similar and equal to Fire-Rite Duxseal as manufactured by J. M. Oliver Co.
- All piping passing through walls, floors or ceilings shall be fitted with chromium plated cast brass escutcheons with fastening set screws similar and equal to F&S Mason Manufacturing Co., F & S Manufacturing Co. or Ritter Pattern and Casting Co.

I. Pipe Supports and Hangers

- All supports and parts shall conform to the latest requirements of the ANSI Code for pressure piping SS1-10 and J158 standard practice SP-65.
- Hangers shall be manufactured by Grinnell Co., Control Iron, Foe and Mason, Blawknex Co. or an approved equal.
- Pipe hangers, rods, inserts and clamps shall be those approved for their respective uses by the Underwriters' Laboratories, Inc.
- Unless otherwise specifically approved, hanger size and spacing shall be:

	Pipe Sizes	Max Hanger Spacing	Minimum Rod Sizes
STEEL	1/2" to 1"	7 ft. o.c.	3/8"
	1-1/4" to 2"	9 ft. o.c.	3/8"
	2-1/2" to 3-1/2"	10 ft. o.c.	1/2"
	4" to 5"	12 ft. o.c.	5/8"
	6" to 8"	12 ft. o.c.	7/8"
COPPER	1/2" to 1-1/4"	6 ft. o.c.	3/8"
	1-1/2" to 2"	8 ft. o.c.	3/8"
	2-1/2" to 3-1/2"	10 ft. o.c.	5/8"

J. Valves

Type	Size	Pressure	Jenkins	Crane	Stockham
Gate	Up to 2"	125 psi.	47U	428-UB	B-105
Gate	Up to 2"	150 psi.	49U	431	B-128
Gate	Up to 2"	300 psi.	280U	634E	B-144
Ball	Up to 2"	300 psi.	32A	930-1F	S217-BR-R
Plug	4" & Up	300 psi.			WA73 OR

- Balancing valves shall be non-lubricating eccentric plug (eccentric) type with adjustable stop valve shall be rated 175 lb. W.C.G. or 400 lb. W.C.G. Valves shall be as manufactured by DeZurik or approved equal.

K. Pipe and Valve Identification

- Provide and affix a set of approved adhesive bands identifying the system and direction of flow.
 - Each set shall consist of one band on which the name of the service is printed in letters not less than 1 inch high.
 - Bands shall be in colors as indicated below and shall conform to ANSI Standard A-13.1.
- | System | Background | Letters and Arrow |
|-------------------------|------------|-------------------|
| Auxiliary Cooling Water | Green | Black |

Adhesive bands shall be V.H. Brady Company, Seton Corp. or an approved equal.

- Place a durable metal or plastic tag permanently affixed to condenser water shut off valves indicating the tenant name, floor served, and "SUPPLY" or "RETURN". Tag shall be 3" x 6" size with black lettering on a green background.

L. Threaded Joints

Steel pipe threaded joints shall be made tight using only an approved pipe joint compound or tape, placed on the male thread only.

CONDENSATE PUMP

Shall be as manufactured by Little Giant Company model # VCL-24-UI (S), 270 Gallons per hour at 1' head, 120V, 1ø or approved equal.

INSULATION FOR CONDENSATE WATER

Insulate 1/2" thick one piece fiberglass, flame spread rating not greater than 25, smoke rating "50". (insulate valves and fittings.)

MINIMUM DRAIN PAN REQUIREMENTS

- Make drain pan 1/2" larger than AC unit on all four sides with upstanding sides 1 1/2" with 1/2" hem turned down outside of pan. Pans shall be made from 16 ga. galvanized steel with soldered corners made water tight.
- Install water sensor in drain pan along with necessary controls to sound local alarm and shut-down AC unit when activated by water in the pan.
- Water alarm shall be "Water Alarm" made by Dorfen, sensor unit model #CS-R (T), remote indicator unit model no. RI-2(T), power supply unit model FS-3 or approved equal. Locate alarm so that they can be easily heard in the occupied area.
- Place a durable metal tag permanently affixed to alarm identifying AC unit and to read "When Alarm sounds call 435-4166 weekdays and weekends."

EXECUTION

- All work in occupied tenant areas shall be performed on other than normal working hours as directed by the Engineer.
- The Contractor shall notify the Engineer when shut-down of existing systems becomes necessary. Shut-down time shall be kept to a minimum.

SHUT-DOWN

Request for shut-downs of main condenser water lines must be delivered to the Manager, WTC Operations at least thirty (30) working days prior to the requested shutdowns and shall be submitted in the final approval of the Manager, WTC Operations.

BALANCING

The Contractor shall provide the service of an air balancing and hydronic testing specialist who specializes in Heating, Ventilation and Air Conditioning systems. Perform all balancing in accordance with sheet metal and air conditioning Contractors National Association (SMACNA).

SUBMITTALS

Submit for approval three (3) sets of shop drawings of ductwork, piping and details. Submit three (3) sets of existing data for A.C. Unit, ceiling diffusers, valves, accessories and three (3) copies of air balancing data report.

APPROVED DRAWINGS, CODES AND PUBLICATIONS

These drawings shall be as manufactured, tested and installed to conform, as a minimum, to provisions of the following codes and standards except where stricter requirements are specified elsewhere herein or shown on the contract drawings.

- National and New York Electrical Code
- National Fire Protection Association (NFPA)
- New York City Building Code
- Underwriters Laboratories, Inc. (U.L.)
- American National Standards Institute Inc. (ANSI)

CONTROLLED INSPECTION

- The ventilation system shall not be placed in operation until it has been tested and inspected in accordance with the requirements of the New York City Building Code, section C20-1301.2.

- The controlled inspection shall be made and witnessed by a licensed professional engineer, employed by the contractor, who shall be approved by the Engineer-of-Record, as part of the work of the sub-contract.

ESTIMATED SUPPLEMENTAL COOLING LOAD

The estimated supplemental cooling load for this Tenant Alteration Application is 8.5 Tons.

FIRE DAMPER NOTES

- All fire dampers shall be rated to maintain the rating of the fire separation. They shall be approved and labeled by the Underwriters Laboratories (U.L.) and New York City Board of Standards and Appeals (B.S.A.). Installation shall be in accordance with this drawing. Dampers shall be similar and equal to Type A as manufactured by Air Balance Inc. Dampers shall be Air Balance Inc. Air Damper Mfg. Corp. or Airstream Products Inc. A copy of the New York City Board of Standards and Appeals Calendar Item showing approval of the proposed fire damper shall be submitted for record.

- All work shall conform, as a minimum, with ASHRAE & SMACNA.

- Connections between collar and ductwork shall be breakaway type such as "S" slip, crimp, or other slip type in accordance with SMACNA Plate 15A, 4th Edition, and Plate 1, SMACNA Fire Damper Guide, 1970.

- Fire damper sleeve at partition of hollow fire rated construction shall be 14 U.S. Standard gauge sheetmetal in conformance with New York City Building Code C20-504.5 (c).

- Taps shall not be of lighter gauge than connecting ductwork. Minimum gauge shall be 16.

- Fire damper and taps shall be attached to sleeve by spotwelding. Welds for attaching damper shall be in two (2) rows, six (6) inches apart, minimum two (2) welds per side. Welds for taps shall be one (1) row, two (2) inches apart.

- Retaining angles shall be placed on both sides of wall and secured to sleeve with No. 10 sheet metal screws or 1/4" dia. nuts and bolts 6 inches center to center, minimum 2 per side. Angles shall be 1-1/2" x 1-1/2" x 1/4 gauge galvanized steel and shall not be attached to the wall.

- The contractor shall seal all joints of the sleeve with sealant. The joint between taps and ductwork shall be made tight and secured by No. 10 sheet metal screws (one per side of rectangular duct, or Type A as manufactured by Air Balance Inc. Dampers shall be Air Balance Inc. Air Damper Mfg. Corp. or Airstream Products Inc. A copy of the New York City Board of Standards and Appeals Calendar Item showing approval of the proposed fire damper shall be submitted for record.

- Sealant shall be 3M Company No. 880 or approved equal and tape shall be Gray Vinyl Duct Tape as manufactured by Nashua Corp. or approved equal.

- To allow for expansion, dampers shall have a top clearance equivalent to 1/8" for each foot of damper height. The side clearance shall be 1/8" for each foot of damper width divided equally to the right and left of the collar. The maximum clearance for the top and the total of both sides shall be 1/2".

- Access door shall be placed on either side of the sleeve only. If the side installation does not permit access to the damper for inspection and maintenance, the door may be placed on the bottom of the sleeve. In any event, access to the fire damper must be assured.

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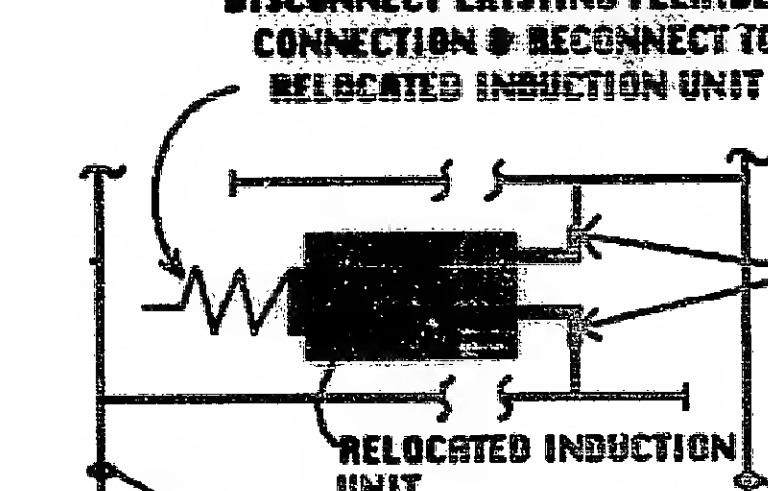
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DISCONNECT EXISTING FLEXIBLE CONNECTION & RECONNECT TO RELOCATED INDUCTION UNIT



SCHEMATIC PIPING CONNECTIONS TO THE RELOCATED INDUCTION UNIT

NOMINAL COPPER PIPE SIZES
NO SCALE

DISCONNECT EXISTING FLEXIBLE CONNECTION & RECONNECT TO RELOCATED INDUCTION UNIT

EXIST. SUPPLY RISER

RELOCATED INDUCTION UNIT

EXISTING RETURN RISER

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